Amendments to the Claims

The following listing of claims replaces all prior versions of the claims and all prior listings of the claims in the present application.

Claims 1-51 (Cancelled).

52. (Currently amended) A method for determining the roughness of a rolling surface of a tyre, comprising ~~the steps of~~:

providing, by means of a sensor device operatively associated with the tyre, a first signal representative of the motion of at least one point of the tyre during ~~its~~ the tyre's rolling on the surface; ~~and~~

processing the first signal for providing an output indicative of the roughness of said rolling surface of the tyre; and

wherein the processing includes a frequency filtering of the first signal for extracting a second signal representative of motion components of said at least one point due to the deformations undergone by the tyre during the rolling.

53. (Cancelled)

54. (Currently amended) The method according to claim ~~53~~ 52, wherein the processing ~~step~~ comprises ~~a~~ data processing ~~step~~ of at least one portion of said second signal for calculating at least one parameter indicative of the roughness of the rolling surface.

55. (Previously presented) The method according to claim 52, wherein the first signal is an acceleration signal representative of the acceleration of said at least one point of the tyre during rolling of the tyre on the surface.

56. (Previously presented) The method according to claim 55, wherein said acceleration signal comprises at least one of the following accelerations of at least one point of the tyre: radial acceleration, longitudinal acceleration, or lateral acceleration.

57. (Currently amended) The method according to claim 52, wherein the first signal is representative of the motion of said at least one point during a revolution of the tyre, said processing ~~step~~ comprising ~~the steps of~~:

determining first temporal/angular coordinates corresponding to a first portion of the first signal associated with ~~a step of~~ the rolling of the tyre, wherein said at least one point is in a zone of contact of the tyre with the rolling surface; and

determining at least on second temporal/angular coordinate corresponding to a second portion of the first signal associated with ~~a step of~~ the rolling of the tyre wherein said at least one point is in a zone contiguous with said contact zone.

58. (Previously presented) The method according to claim 57, wherein said contiguous zone is an input zone which precedes said contact zone according to the sense of rotation of the tyre.

59. (Previously presented) The method according to claim 58, wherein said input zone corresponds to an angular sector of the tyre having a present angle of aperture.

60. (Currently amended) The method according to claim 52, wherein the processing ~~step~~ comprises ~~an estimation step of~~ estimating the angular velocity of the tyre during the ~~rotation~~ rolling of the tyre.

61. (Currently amended) The method according to claim 60, wherein the ~~estimation step~~ estimating comprises ~~a calculation step of~~ calculating the angular velocity on the basis of at least one value of the centripetal acceleration of the tyre and on the basis of the radius of the tyre.

62. (Currently amended) The method according to claim 54, wherein the processing ~~step~~ comprises ~~a definition step of~~ defining said at least one portion of the second signal on the basis of temporal/angular coordinates, said at least one portion being correspondent to one between the contact zone and the contiguous zone.

63. (Currently amended) The method according to claim 57 wherein the processing ~~step~~ comprises ~~a definition step of~~ defining said at least one portion of the second signal on the basis of temporal/angular coordinates, said at least one portion being correspondent to one between the contact zone and the contiguous zone.

64. (Currently amended) The method according to claim 54, wherein the processing ~~step~~ includes:

filtering the first signal for extracting the second signal;

carrying out an analogue digital conversion for obtaining digital data corresponding to said second signal; and

elaborating at least part of said digital data and providing an output signal carrying the current parameter indicative of the roughness of the surface on which the rolling of the tyre occurs.

65. (Currently amended) The method according to claim 64, wherein said elaborating ~~step of~~ at least part of the digital data comprises calculating a mean of values associated with a pre-selected number of digital samples.

66. (Currently amended) The method according to claim 64, further comprising a data pre-storage ~~step~~ which defines at least one first reference curve representative of a first trend of the roughness parameters measured with varying angular velocity of the tyre, the first reference curve being indicative of a first class of roughness associated with a first reference rolling surface.

67. (Currently amended) The method according to claim 66, further comprising an additional data pre-storage ~~step~~ which defines a second reference curve representative of a second trend of roughness parameters measured with the varying

angular velocity of the tyre, the second reference curve being indicative of a second class of roughness distinct from the first class and associated with a second reference rolling surface.

68. (Currently amended) The method according to claim 66, further comprising ~~the steps of~~:

receiving the output signal carrying the current parameter;

receiving an additional output signal indicative of the current angular velocity assumed by the tyre essentially during the measurement of the current parameter; and

performing a comparative elaboration of the current parameter with the values of said at least first reference curve, in such a manner as to establish a roughness typology, to which the surface on which the rolling of the tyre is occurring belongs, essentially during the measurement of the current parameter, the comparative elaboration being carried out by taking account of present angular velocity.

69. (Currently amended) A method for controlling the behaviour of a vehicle to which at least one tyre is mounted, comprising ~~the steps of~~:

determining information relating to the roughness of a rolling surface of the tyre in accordance with a method according to claim 52; and

making available the information relating to the roughness to a vehicle control system.

70. (Previously presented) The method according to claim 69, wherein said control system is an Anti Blocking System.

71. (Currently amended) A system for determining the roughness of a rolling surface of a tyre to be mounted onto a vehicle, the system being operatively associable with the tyre and comprising:

a sensor device operatively associated with the tyre for providing a first signal representative of the motion of at least one point of the tyre during ~~the~~ a rolling of said tyre on a surface having a respective roughness; ~~and~~

a processing stage of the first signal for generating an output indicative of the roughness of said tyre rolling surface; and

wherein the processing stage is of such a type as to perform a frequency filtering of the first signal for extracting a second signal representative of components of motion of said at least one point due to deformations undergone by the rolling tyre.

72. (Cancelled)

73. (Currently amended) The system according to claim ~~72~~ 71, wherein the processing stage performs an elaboration of at least one part of said second signal for calculating at least one parameter indicative of the roughness of the rolling surface.

74. (Previously presented) The system according to claim 71, wherein said sensor device comprises an accelerometer and the first signal is an acceleration signal

representative of the acceleration of said at least one point of the tyre during rolling on the surface.

75. (Previously presented) The system according to claim 74, wherein said acceleration signal comprises at least one of the following tyre accelerations: radial, longitudinal, or lateral.

76. (Currently amended) The system according to claim 71, wherein the first signal is representative of the motion of said at least one point during one revolution of the tyre and the processing ~~step~~ stage comprises processing the first signal in order to determine temporal/angular coordinates corresponding to:

a first portion of the first signal associated with a rolling ~~step~~ stage of the tyre wherein said at least one point is found in a zone of contact with the surface; and

a second portion of the first signal associated with a rolling ~~step~~ stage of the tyre wherein said at least one point is found in a zone contiguous to said contact zone.

77. (Previously presented) The system according to claim 76, wherein said contiguous zone is an input zone which precedes said contact zone according to the sense of rotation of the tyre.

78. (Previously presented) The system according to claim 77, wherein said input zone corresponds to an angular sector of the tyre having a prefixed angle of aperture.

79. (Currently amended) The system according to claim 71, wherein the processing ~~step~~ stage comprises estimating the angular velocity of the tyre assumed during the ~~rotation~~ rolling of the same.

80. (Currently amended) The system according to claim 79, wherein the processing ~~step~~ stage comprises estimating the angular velocity on the basis of at least one centripetal acceleration value of the tyre and on the basis of a tyre radius.

81. (Currently amended) The system according to claim 73, wherein the processing ~~step~~ stage comprises identifying said at least one portion of the second signal on the basis of temporal/angular coordinates, said at least one portion being correspondent to one between the contact area and the contiguous area.

82. (Currently amended) The system according to claim 76, wherein the processing ~~step~~ stage comprises identifying said at least one portion of the second signal on the basis of temporal/angular coordinates, said at least one portion being correspondent to one between the contact area and the contiguous area.

83. (Currently amended) The system according to claim 73, wherein said processing ~~step~~ stage comprises a band pass filtering block for providing said second signal by starting from the first signal.

84. (Previously presented) The system according to claim 83, further comprising:

an analogue-digital converter for obtaining data corresponding to said second signal and having associated a prefixed sampling frequency; and

a memory device capable of storing at least said digital data.

85. (Currently amended) The system according to claim 84, wherein said processing ~~step~~ stage comprises a processing unit for elaborating at least part of said digital data and providing the at least one parameter indicative of the roughness of the rolling surface.

86. (Previously presented) The system according to claim 83, wherein said band pass filtering block has a passing band of 300 Hz to 5000 Hz.

87. (Previously presented) The system according to claim 86, wherein said band pass filtering block has a passing band of 300 Hz to 2500 Hz.

88. (Previously presented) The system according to claim 83, wherein said filtering block comprises at least one tracking filter having a respective cut-off frequency modifiable as a function of the angular velocity of rotation of the tyre and correlated with a factor dependent on the number of block patterns present on the tread of said tyre.

89. (Previously presented) The system according to claim 81 or 85, wherein said at least one portion of samples to be processed by the processing unit is determined as a function of sampling frequency and as a function of an extension between said contiguous zone and said contact zone.

90. (Previously presented) The system according to claim 71, wherein said sensor device is capable of being fixed to the tyre.

91. (Currently amended) The system according to claim 89, further comprising a transmission device connected to said processing ~~step~~ stage and equipped with a first antenna in order to irradiate at least one external signal.

92. (Previously presented) The system according to claim 91, wherein said at least one external signal carries information content of the first signal.

93. (Previously presented) The system according to claim 91, wherein said at least one external signal carries information indicative of the roughness of the tyre rolling surface.

94. (Previously presented) The system according to claim 91, wherein said at least one external signal comprises a velocity signal representative of present angular velocity of the tyre during its rolling.

95. (Previously presented) The system according to claim 92, further comprising:

a fixed unit installable on a vehicle and including a second antenna coupled to a reception device in order to receive said external signal; and

an additional processing unit connected to a reception device in order to process the external signal received.

96. (Previously presented) The system according to claim 71, wherein said sensor device is capable of being fixed to a supporting rim of the tyre.

97. (Currently amended) A tyre for a vehicle, comprising:

a sensor device operatively associated with the tyre for providing a first signal representative of the motion of at least one point of the tyre during ~~the~~ a rolling of said tyre on a surface having a respective roughness, said sensor device comprising a

processing ~~step~~ stage of the first signal for generating an output indicative of roughness of said tyre rolling surface; and

wherein the processing stage is so as to perform a frequency filtering of the first signal for extracting a second signal representative of motion components of said at least one point due to deformations undergone by the tyre during rolling.

98. (Cancelled)

99. (Currently amended) The tyre according to claim ~~98~~ 97, wherein the processing ~~step~~ stage is capable of performing the processing of at least one portion of said second signal for calculating at least one parameter indicative of the roughness of the rolling surface.

100. (Currently amended) The tyre according to claim ~~98~~ 97, wherein said sensor device comprises an accelerometer and the first signal is an acceleration signal representative of acceleration of said at least one point of the tyre during rolling on the surface.

101. (Previously presented) The tyre according to claim 100, wherein said acceleration signal comprises at least one of the following tyre accelerations: radial, longitudinal, or lateral.

102. (Previously presented) The tyre according to claim 97, wherein the sensor device comprises a casing fixed to one wall of the inside of the tyre by means of a fixing element.

103. (Previously presented) The tyre according to claim 97, comprising at least one additional sensor device operatively associable with the tyre for providing an additional correspondent signal representative of the motion of at least one additional point of the tyre during the rolling of said tyre on the surface.

104. (Previously presented) A wheel comprising a supporting rim and a tyre in accordance with claim 97 associated with said supporting rim.